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ABSTRACT

This module was not meant to make handwriting analysts of students, but to make them aware that mathematics is used in analyzing handwriting. Activities revolve around ratio, mean, mode, measurement and some graphing. Sample spaces are explored and used to gain insight into how people write habitually. (Author/MK)

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ENVIRONMENTAL MODULE FOR USE IN A MATHEMATICS LABORATORY SETTING

People Patterns - HANDWRITING

by

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TEACHER'S GUIDE

People Patterns - HANDWRITING

This module may be used in many ways.

1. In part or in total to supplement existing material.
2. As a unit.
3. In groups of students with a chosen leader to help others.
4. You may find some activities appropriate for total class involvement while others would be better used in a small group situation.
5. You may want to use this module as a total class project with small groups working at different activities and the final results shared with the whole class.

Materials

Contained in this module:

1. Student Worksheets #1 to 14
2. Sample handwriting
3. Sample printing
4. Metric ruler
5. Transparent protractor

Optional (Teacher provides):

1. Signatures of various famous people in various fields or professions.

OBJECTIVES

.Students will collect data (sample spaces). From the collected data, students will set up ratios, find means, mode, measurements, do graphing and measure angles of slant.

.Given a writing sample, the student will be able to analyze and determine who did the particular handwriting.

OVERVIEW

.This module is not meant to make handwriting analysts of your students. It will make them aware that math is used in analyzing handwriting.

.Opportunities in the field of handwriting analysis are becoming more numerous. Students might be interested in knowing that there is a need for handwriting analysts in law enforcement agencies and judicial courts. This module will simply give the student a beginning understanding of what handwriting analysis is and what it does.

.All activities are centered around handwriting, whether written or printed. Handwriting is one way to identify a person or the authenticity of a signature on a document.

.Activities revolve around ratio, mean, mode, measurement and some graphing. Sample spaces are explored and used to gain insight to how people write habitually.

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I. Student Worksheet #'s 1 to 6

A. Materials provided:

1. Student Worksheet #'s 1 to 6

B. Materials needed:

1. Metric ruler

C. Work to be completed by students:

1. Student Worksheet #'s 1 to 6

D. Teaching Suggestions:

1. Measurements should be done using the metric system.

2. You may want to examine the metric system of measurement and how to use the metric ruler, as a preliminary exercise for this module.

3. You could start each activity with the student examining his own handwriting, then have him work in a group where samples of handwriting would be exchanged.

II. Student Worksheet #7

A. Materials provided:

1. Student Worksheet #7

B. Materials needed:

1. Transparent protractor
2. Lined writing paper

C. Work to be completed by students:

1. Student Worksheet #7

D. Teaching Suggestions:

1. You may want to show the proper use of the protractor.

2. You may want to have the student examine his own handwriting and then work in a group.

III. Student Worksheet #8

A. Materials provided:

1. Student Worksheet #8

B. Materials needed:

1. Lined paper

C. Work to be completed by students:

1. Student Worksheet #8

D. Teaching Suggestions:

1. You may want the students to examine his own handwriting first to become familiar with what is meant by handwriting pressure.

2. The student will need suggestions regarding the scale he will be using.

IV. Student Worksheet #9

A. Materials provided:

1. Student Worksheet #9

B. Materials needed:

1. A school form that appears important (an insurance form)

C. Work to be completed by students:

1. Student Worksheet #9

D. Teaching Suggestions:

1. You might let the students decide the method they will use to explain the comparison.

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V. Student Worksheet #'s 10 and 11

A. Materials provided:

1. Student Worksheet #'s 10 and 11

B. Materials needed:

1. Samples of what is considered traditional handwriting

C. Work to be completed by students:

1. Student Worksheet #'s 10 and 11

D. Teaching Suggestions:

1. You may want to have some samples of handwriting taken from an elementary school.

VI. Student Worksheet #12

A. Materials provided:

1. Student Worksheet #12

B. Materials needed:

1. Metric ruler
2. Transparent protractor

C. Work to be completed by students:

1. Student Worksheet #12

D. Teaching Suggestions:

1. You may want the students to work individually. This would give them the opportunity to see how well they can perform on their own.

VII. Student Worksheet #13

A. Materials provided:

1. Student Worksheet #13

B. Materials needed:

1. Handwriting samples of famous people (Library is a good source.)

C. Work to be completed by students:

1. Student Worksheet #13

D. Teaching Suggestions:

1. You might have a collection of famous people's signatures available.

2. You might use this activity to help students become familiar with the use of the library while looking for signatures of famous people.

VIII. Student Worksheet #14

A. Materials provided:

1. Student Worksheet #14

B. Materials needed:

1. Metric ruler
2. Transparent protractor

C. Work to be completed by students:

1. Student Worksheet #14

D. Teaching Suggestions:

1. This activity might be used as a self-test for the student to see how much he has learned about handwriting analysis.

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"Hi lo"

Draw a straight line, approximately 15 cm. long, across the paper. Using lower case letters (no capitals), write on this line the words, "hello, math lab."

Measure the height of each upper loop letter (h, l, b), and find the mean height. Measure the height of each middle zone letter (e, o, a), and find the mean height. Divide the mean height of the upper loop letter by the mean height of the middle zone letter.

Experts in the field of handwriting analysis tell us that if we write as we have been taught by our grade school teachers, our upper loop letters would be approximately two times as tall as our middle zone letters. How close were you to the traditional proportion?

Try this activity, using handwriting samples of ten of your classmates. How many of them were using the traditional proportion as compared to those who were not? Make a sample, using younger people as compared to older people in your school. Does this proportion change with the age of the person?

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Consider the Case

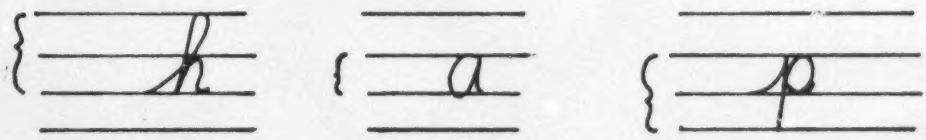
Exchange a sample of your handwriting with one of your classmates. Use only the lower case letters (no capitals) of your classmate's sample for the following activities.

Measure the height of letters such as a, e, i, o, u, etc. (middle-zoned letters.) Find the mean height.

Measure the height of such letters as l, h, b, etc. (upper-looped letters.) Find the mean height.

Measure the height of letters such as p, y, q, etc. (lower-looped letters. Find the mean height.)

Example:



height of middle-zoned letter

height of upper-looped letter

height of lower-looped letter

Using the mean height of the letters, set up a ratio between the middle-zoned letters and the upper-looped letters.

Get another sample from the same classmate. Set up a ratio again between the mean height of the middle-zoned letters and the mean height of the upper-looped letters. Are the ratios the same for both samples? Are the ratios close for both samples?

Try a few more samples from the same classmate, making sure that he does not write the same message or your conclusions will be biased.

You might try setting up a ratio between the mean height of the middle-zoned letters and the mean height of the lower-looped letters. Compare this ratio to your first set of ratios.

It might be interesting to see what happens if you have your classmate print a message for you. How does this ratio compare to the cursive sample?

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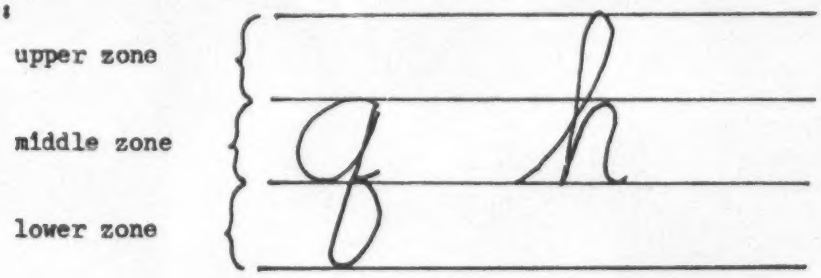
Zone to Zone

Exchange a sample of your handwriting with a sample of one of your classmates. Divide <u>each letter</u> of the sample into three distinct parts or zones (<u>excluding</u> the middle-zoned letters.)

Example:



Measure the height of the zone of each letter and compute a mean height for each zone. Now set up a ratio between the mean height of the middle zone and the mean height of each of the other two zones. Do this for a number of handwritten samples of the same classmate. What conclusions, if any, can you determine?

You might want to do the above activity, using the <u>printing</u> of the same classmate. Is there any relationship between your friend's handwriting letter ratios and his printing letter ratios?

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Do the I's Have It?

Have members of your class write a short story (50 words) about something that involved them. Take a sample to see how many times they used each letter of the alphabet.

Indicate, using ratios, how many more times one letter is used as compared to another letter. Which letter is least used? Which letter is most used?

Compare your findings with those of at least five of your classmates. You might try this activity using words instead of letters.

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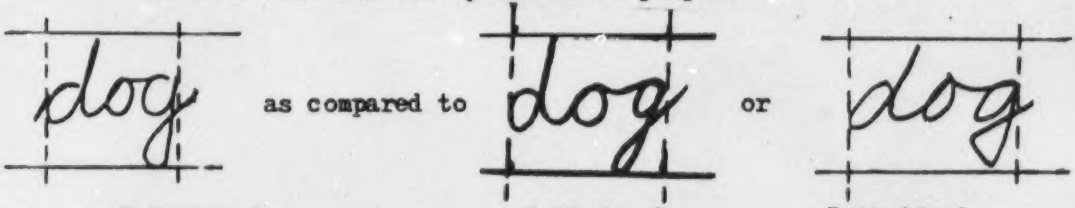
Middle-Age Spread

Using the sample of your classmate's writing, find the relationship (ratio) between the length of each word and the height of the word. Be sure that you compare words with equal numbers of letters.

Example:

The same word written by different people.



Individual A

Individual B

Individual C

$\frac{\text{height}}{\text{width}} = \frac{2 \text{ cm.}}{2 \text{ cm.}} = \frac{1}{1}$

$\frac{\text{height}}{\text{width}} = \frac{2.2 \text{ cm.}}{2 \text{ cm.}} = \frac{11}{10}$

$\frac{\text{height}}{\text{width}} = \frac{1.8 \text{ cm.}}{2.4 \text{ cm.}} = \frac{3}{4}$

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Stretching a Word or Two

Using a sample of your classmate's writing, determine the mean length of his three-letter, four-letter and five-letter words.

How do each of the above word-length means compare to the mean length of the sentences? How does the mean length of the sentences compare to the number of sentences written on a standard size paper ($8\frac{1}{2}$" x 11")?

Find the mean length of the spaces between words. How does this length compare to the mean width of the letters?

You might want to compare this student sample to other classmate's samples.

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Slightly Slanted Selections

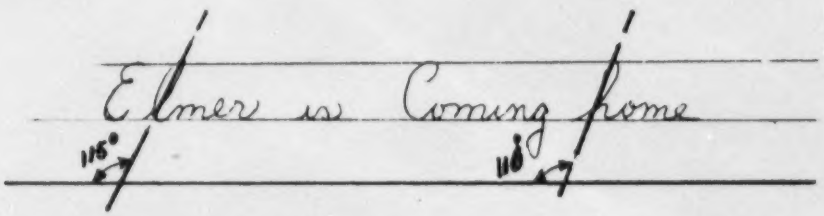
When writing, some people slant their letters to the right while others slant to the left.

Some are just as upright as they can be.

There are those who slant some letters to the right and others to the left.

This information can be useful in identifying the writer of a handwriting sample.

This is an example of a person who makes his loop-letters at approximately 112° to the horizontal:



Using lined paper, write a short note to someone you know. With this sample, measure the angle of slant of upper-looped and lower-looped letters. Determine the mean angle of slant of these letters.

Exchange a sample of your handwriting with one of your classmates. Find the mean angle of slant of his handwriting.

Check with other students in your class to determine whether more people slant their handwriting to the right or to the left. Explain this comparison in some mathematical manner.

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The Pressure Is On

Each of us exerts some pressure on the paper when we write. This pressure will vary from person-to-person. By turning over the paper after it has been written upon, we can tell how much pressure has been exerted by noting the raised areas.

Have one of your classmates write short notes to you at five to ten minute intervals. See if there is a pattern of writing pressure for this individual. You may want to make up a scale and use it with your sampling.

Now try the above with other members of your class, using the same scale that you made earlier. You might investigate to determine if there are pressure differences between boys and girls, between athletes and non-athletes, etc.

Handwriting analysts use this sort of information to help determine if a sample of handwriting was written by a particular person. This information can sometimes be used to help indicate the emotional state of the writer.

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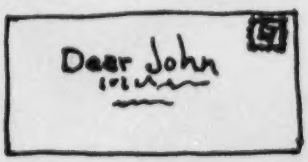
Is It Note Worthy?

Have you ever received a note from someone you know and yet you were unable to associate the writing with that person?

Handwriting analysts tell us that people do their routine writing one way and their signature seems to be of another pattern. Though a person may normally be sloppy in his penmanship, he may take great pains when affixing his signature, or vice versa.

Have some friends in class write an inconsequential note to you and sign it. Then have them put their signature on what appears to be an important document. Compare both signatures to determine any similarities or differences.

Explain your comparisons.



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What's the Connection?

How many students in your class write a word in parts rather than all together, as taught in grade school?

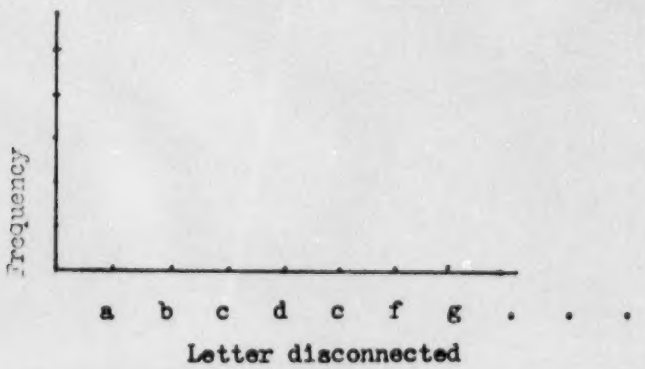
Example:

relation ship determine
relationship determine

Are there particular words that some people write in parts more frequently?
Are there particular letters disconnected more frequently than others?

Have ten classmates write a 50-word paper for you. From these samples, set up a ratio to show how many times more a particular letter is disconnected than another letter. Compare your list with lists made by other students in your class.

Example:



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Doing Your Own Thing

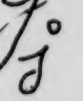
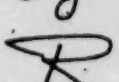
What is the probability that you will drop the beginning of some of the traditional ways of writing letters?

Example:

Traditional	Personal Trait

What is the probability that you will add some fancy curlicues or personal traits of some sort to your signature, departing from the traditional point of writing.

Example:

Traditional	Personal Trait
	
	

Do people depart from the traditional point in writing more when writing capitals or when writing lower-case letters?

Set up a ratio to show this relationship.

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Is That Right?

Handwriting analysts tell us that a person's handwriting can be identified even if someone tries to disguise it.

Have members of your class write you a message first with their right hand and then with their left hand. See if you can notice any patterns that are indicated in a person's writing regardless of which hand he uses. Remember, check by setting up ratios between letter size, word size, zones, etc.

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Write On

Do a little research and collect signatures and handwriting samples of famous people. Group these samples according to the fields or areas involved:

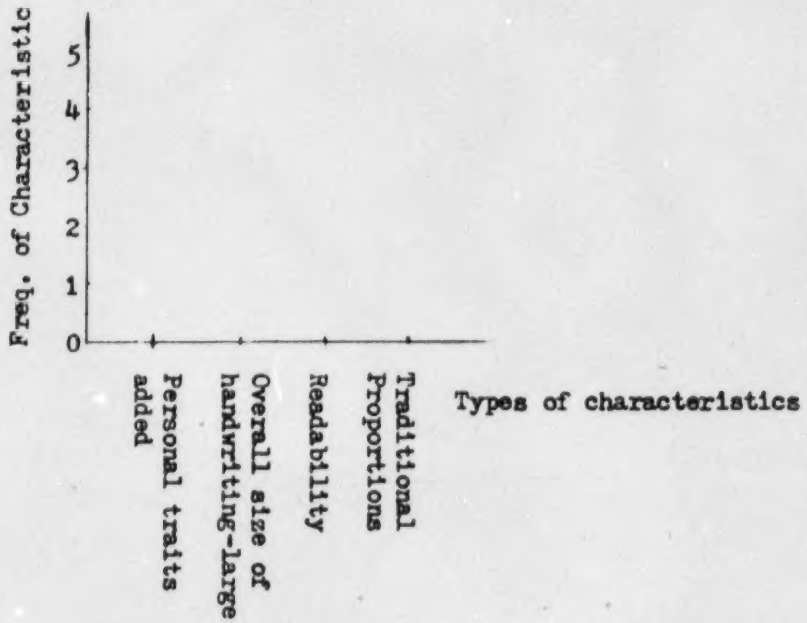
People in the sciences

People in the arts

People in the field of your choice.

For each group, prepare a graph comparing the frequency of a characteristic to the type of characteristic. Think of more characteristics to use for this exercise.

Example: People in the sciences



Determine similar characteristics in handwriting samples for each group. Prepare a graph to compare one group to the other.

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Who Doodled It?

Collect two samples from each of five classmates. One sample should be signed and the other not signed. Shuffle the samples and then have each person attempt to determine who wrote each unsigned paper. Have each classmate explain how he reached his conclusion.

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